NOTES ON *OCONOPERLA* (PLECOPTERA: PERLODIDAE)[1]

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ABSTRACT: Collections of *Oconoperla* made in mountainous areas of North and South Carolina during May, 1983, included the first gravid females known for the genus. The female description, originally based on a dissected, pre-emergent nymph is modified and the chorionic fine structure of the egg is described from scanning electron photomicrographs. These data support the Stark & Stewart (1982) hypothesis that *Oconoperla* is most closely related to the *Yugus-Malirekus* group of genera. Study of the Needham & Claassen (1925) *Perla innubila* holotype suggests the placement of *O. weaveri* in the synonymy of this species.

Stark & Stewart (1982) proposed *Oconoperla* for a single male and five unique nymphal specimens. Female terminalia were described from a dissected nymph but recent collections of female imagoes indicate this earlier description was inadequate since the subgenital plate was not fully expanded. Additionally, examination of the holotype of *Perla innubila* Needham & Claassen, a species currently placed in *Yugus* (Illies 1966; Zwick 1973), has revealed *Oconoperla weaveri* Stark & Stewart to be a synonym. The systematic changes resulting from these new data are indicated below.

Oconoperla innubila (Needham & Claassen) NEW COMB.

Perla innubila Needham & Claassen (1925). Holotype ♀, Sunburst, NC (CU #1142).
Isogenus innubilus. Ricker (1952).
Yugus innubilus. Illies (1966).
Oconoperla weaveri Stark & Stewart (1982). New synonymy.

Female.-Macropterous. Forewing length 14-15 mm; body length 12-13 mm. Subgenital plate covering most of sternum 9, apex truncate; margins and ventral surface of plate densely covered with short setae (Fig. 1).

Egg.-Cross section triangular. Collar absent. Narrow opercular line present in apical third. Irregularly hexagonal follicle cell impressions composed of erect clusters of scales covering entire chorion; additional scale clusters scattered within follicle cell impressions. Micropyles grouped in short rows of ca. 3 per side near opercular line; orifices surrounded by a thin lip. Follicle cell impressions surrounding micropyles larger; some forming irregular rosettes (Figs. 2, 3).

Material examined.-NC: Haywood Co., trib. Cove Crk. off Rt 1395, 16-V-83, B. Kondratieff & F. Kirchner, 5♂, 3 ♀. Macon Co., 1 mi N Scaly Mountain Hwy 106, 20-V-83, B. Stark, 1 nymph; Robin Branch, Wayah Bald, 18/19-V-83, BS, BK, FK, 3 ♂, 2 ♀ (reared), 10 nymphs; Dirty John Crk, Wayah Bald, 18-V-83, BS, BK, FK, 2 ♂ (reared), 2 nymphs; Upper Wayah Crk, Berties Falls, 23-V-84, BS, 1 nymph. SC: Oconee Co., small spring at

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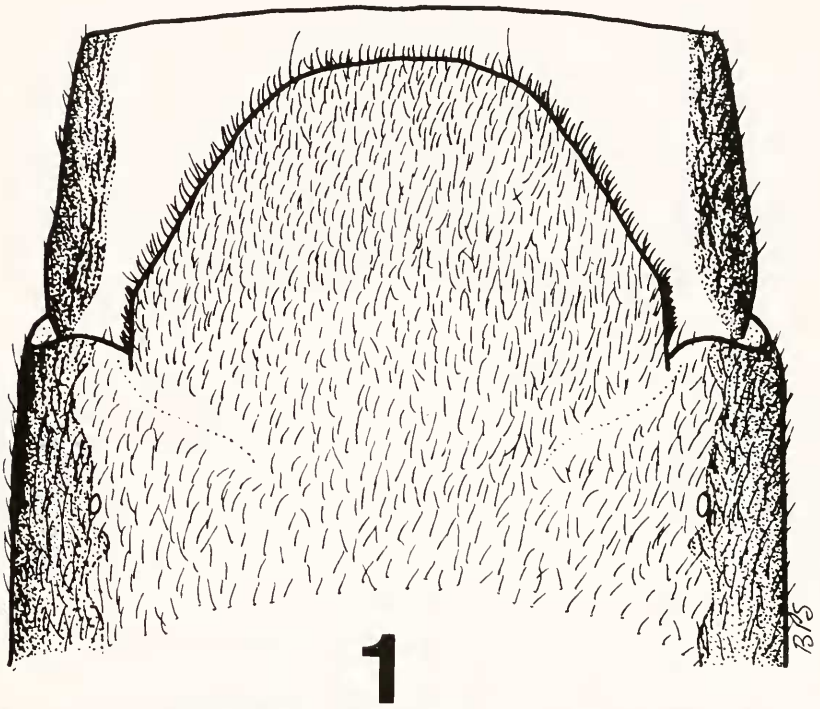
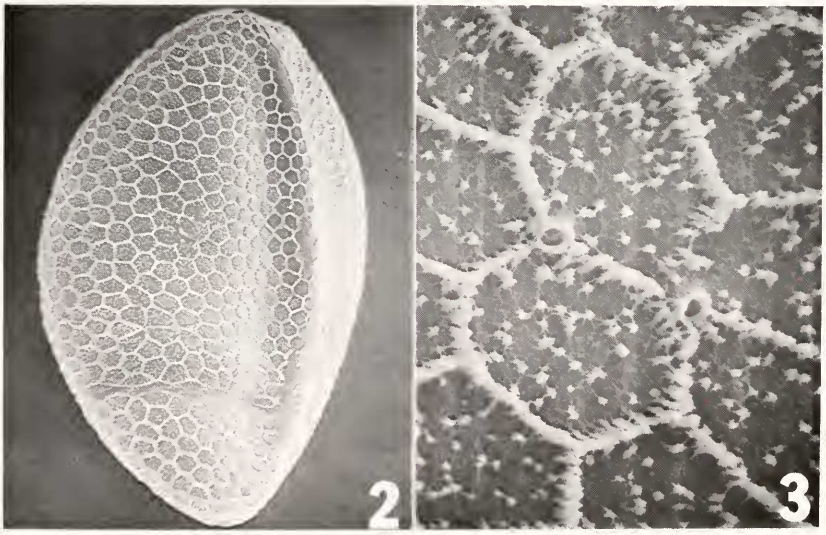


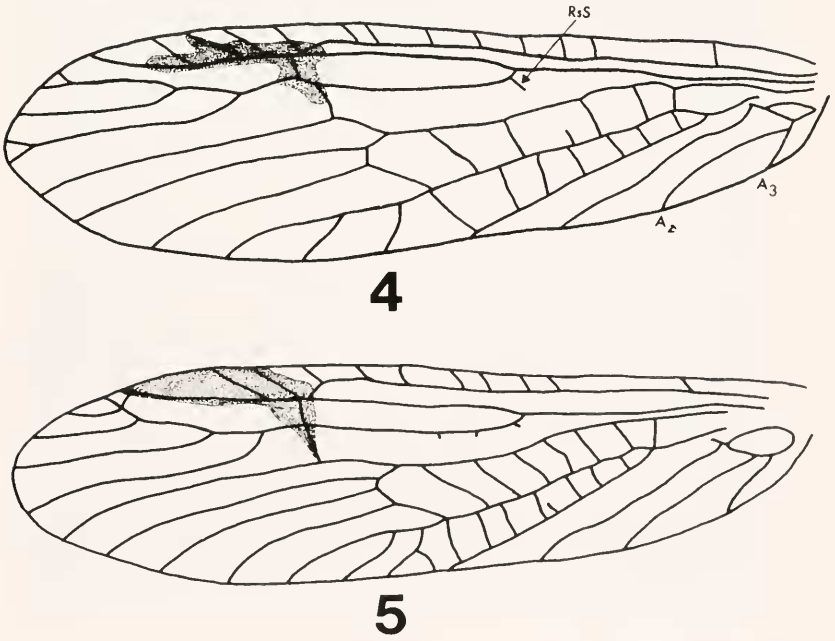
Fig. 1. *Oconoperla innubila*, female subgenital plate.



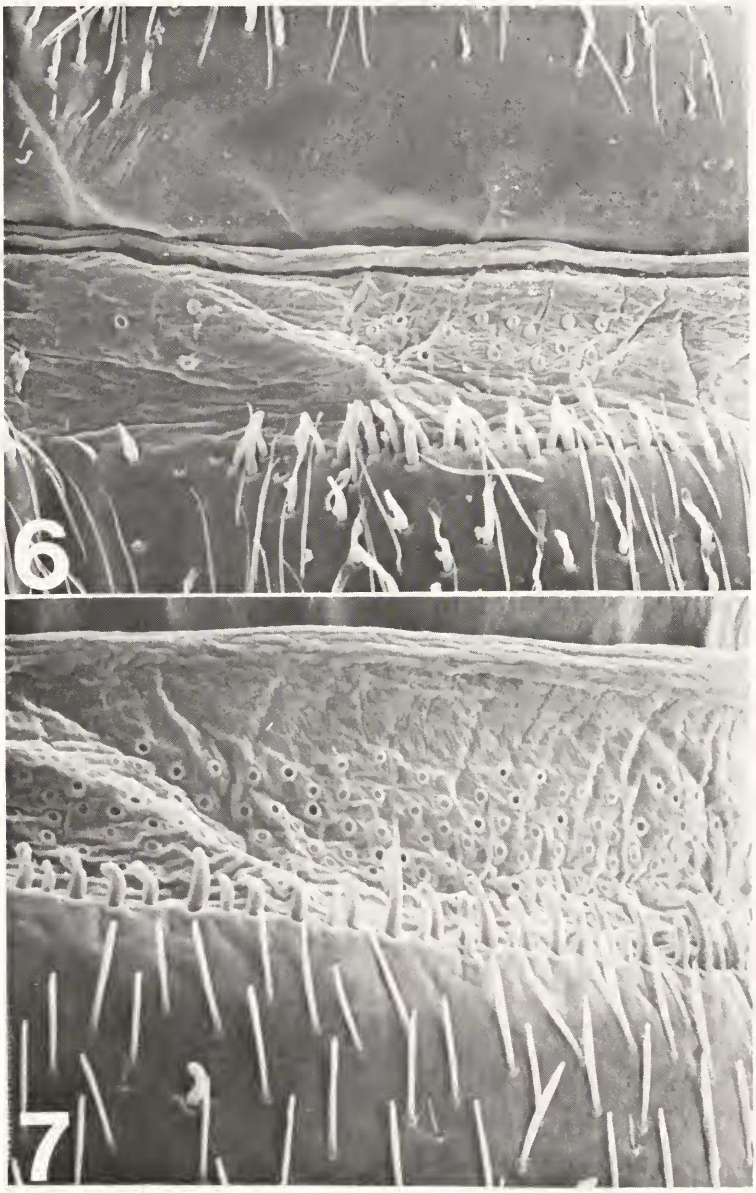
Figs. 2-3. *O. innubila* egg. 2. Entire egg, 240X. 3. Micropylar detail, 2000X.

Upper Wash Branch, Tamassee Rd, 20-V-83, BS, 1 ♂. TN: Sevier Co., small spring 1 mi SW Newfound Gap, Clingman's Dome Rd, 18-III-82, J. Weaver & R. Holzenthal, 1 nymph.

Discussion.-This synonymy was suggested by the rather distinctive spur vein near the origin of Rs in the forewing (Fig. 4). Both Needham & Claassen (1925) and Ricker (1952) illustrate this feature. Ricker (1952) noted Rs spur veins are not unique to this species; among perlodine stoneflies they are known to occur in *Isogenoides varians* (Walsh), *Helopicus subvarians* (Needham & Claassen), *Cultus decisus* (Walker) and *Chernokrilus misnomus* (Claassen). In other species (except possibly *I. varians*), however, Rs spur veins are rare whereas in the available sample of *Oconoperla* specimens they are always present. In South Carolina specimens examined to date, the tendency is toward short, multiple spur veins (Fig. 5). Several other venational features noted by Needham & Claassen (1925) such as number of Rs branches are highly variable (Figs. 4 & 5). In the Wayah Bald specimen (Fig. 4), both Rs1 and Rs4 are forked to give 5 total branches while in the South Carolina specimen (Fig. 5) only Rs1 is forked and Rs5 arises near the cord. These specimens also differ in the number of M branches and in the origins of A3 along with other minor variations.



Figs. 4-5. *O. innubila* wings. 4. Female, Wayah Bald, NC. 5. Male, Wash Branch, SC.



Figs. 6-7. Intersegmental area of Ab 9-10, dorsal 6. *Oconoperla*, 330X. 7. *Malirekus*, 330X.

The holotype specimen of *Perla innubila* (Cornell Univ. #1142) is in such poor condition that a completely reliable determination of the species status likely can never be made, however, I am satisfied on the basis of similarities in the head, thorax and wings and on the basis of range proximity that *Oconoperla weaveri* and *Yugus innubilus* represent a single species.

Stark & Stewart (1982) suggested on the basis of male genitalic features that *Oconoperla* is most closly related to the *Malirekus-Yugus* generic cluster. This hypothesis would appear to be supported by egg data. Among Nearctic genera with triangular-cross sectioned eggs only *Yugus* and *Malirekus* share the elaborate scale structures which form the follicle cell impression boundaries in *Oconoperla.* However, it seems likely, as Stark & Stewart suggested, that this relationship is remote and *Oconoperla* probably represents the specialized sister group for the *Yugus-Malirekus* lineage.

Based on field collection of the original series of specimens, Stark & Stewart (1982) suggested *Oconoperla* nymps were associated with "splash zones of small spring seeps." This generalization also applies to the larger sample now available, and it is interesting to note that *Oconoperla* nymphs share a number of "terrestrial adaptations" with gripoterygid nymphs (McLellan 1977). These include loss of leg and cercal hair fringes (Stewart & Stark 1984) and a reduction in cercal length relative to *Malirekus* and *Yukus* nymphs. Additionally, *Oconoperla* nymphs have fewer chloride cells (Figs. 6 & 7) on comparable body regions than nymphs of either of these related genera from the same drainage basins. These data suggest *Oconoperla* nymphs spend much of their developmental period in moist splash zones which are not influenced by current.

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